NOTE VI.

DESCRIPTIONS OF EARTHWORMS.

BY

Dr. R. HORST.

IV.

Acanthodrilus Beddardi n. sp., a remarkable earthworm from Liberia.

(Plate 6).

Among the specimens of *Ac. Büttikoferi* from Liberia, described in my foregoing paper [1], I found a number of smaller Acanthodrilidae, which at first I believed to be young individuals of the same species. However examining them more accurately, I recognized that they present some characters, which hitherto are not observed in any other species of the genus *Acanthodrilus*, and I have no doubt, that they belong to a new species. In honour of the Naturalist, who had done so much to increase our knowledge of the tropical Earthworms, I will name it *Ac. Beddardi.*

The length of the largest individual is about 160 m.m. The cephalic lobe is rather long, compared to that of *Ac. Büttikoferi* and the setae are more projecting than in this species. The setae are arranged in four pairs, upon a white-

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[1] This Journal, Vol. IX, p. 291.

colored ridge in the middle of each segment; in the anterior segments they are situated on the ventral side of the body, however in the posterior segments the dorsal pair of them is placed more laterally. The clitellum is very distinct, extending from segment (13) 14 to (19) 20; it shows at the ventral side a deep, rectangular groove over its total length. The male generative apertures are situated in this depressed area, upon two pairs of papillae, in the 17th and 19th ring. The copulatory pouches open between the 7th and 8th, the 8th and 9th segment, in front of the ventral pairs of setae; in the vicinity of the openings there is a glandular, not well-defined area upon the ventral side of segment 7, 8 and 9.

The penial setae present a very singular appearance, quite different from that of the two other Liberian *Acanthodrilus*-species [1]. The length of these bristles is about 3 m.m. Their distal extremity (fig. 3) is largely dilated and is furnished with a structure, resembling somewhat a cap; the one side (we may name it the dorsal half) of this cap is convex, smooth, bearing about 17 short, strong, hook-shaped spines and presents along its inferior edge a prominent brim, which is slightly folded and furnished with some small teeth. The opposite part (the ventral half) of the cap is divided by a ridge-shaped elevation in two halfs, which are a little concave and beset over the whole surface with small, densely crowded spines. The main stalk of the bristle is furnished in the superior part of its ventral side, over about $^1/_6$ of its total length, with small, triangular, rather distant spines;, opposite them the dorsal side shows a group of 9 to 10 much larger, ridge-shaped teeth. Perhaps the exact shape of these bristles can be gathered better from an inspection of the figures 3, *a* and *b*, than from any detailed description.

Ac. Beddardi possesses in the vicinity of the spermathecae still another kind of modified setae, about of the

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[1] This Journal, Vol. IX, pl. 4, and pl. 5 fig. 3.

same length as the penial setae, but quite different in appearance. The distal entremity of these bristles (fig. 4) is furnished with a conical point, forming an angle with the main axis of the bristle; beneath this point it is beset all around with large, triangular spines. The situation of these bristles — we may name them copulatory setae, to distinguish them from the penial setae, the modified bristles situated near to the male generative pores — is very remarkable. On opening the worm from the dorsal side, we recognize in the vicinity of each copulatory pouch a large muscle (fig. 1 and 2, *m*). These muscles, highly developed in proportion to the muscular layers of the body-wall, represent the locomotive muscle-fascicles of the ventral bristles of segment 7 and 8; their proximal end is not only inserted, as usual, into the proximal extremity of the bristle, but is also attached to the muscular layer of the body-wall in the 8th and 9th ring, not far from the median dorsal line. Each muscle is flattened vertically and has a breadth of $1^{1}/_{2}$ to 2 m.m.; it consists of two fascicles, whose fibres do not runn in the same direction. There is namely a superior fascicle, whose fibres are directed to the ventral median line of the body, and an inferior bundle, whose fibres are directed more forward. The muscle-fibres have a lamelliform-shape and are arranged radially around a copulatory bristle, which is situated exactly in the centre of them; moreover a bundle of 4 to 6 similar bristles, in different stages of development, are placed against the posterior border of each muscle, and undoubtedly have the function of reserve-bristles (fig. 2, *cb*).

Each pair of copulatory setae is accompanied by a flat, band-shaped glandular body, which like a funnel surrounds their distal extremity; the two glands of each side are connected to each other and therefore the total glandular body has the shape of a ∽ (fig. 1 and 2, *x*).

The gland has a lobulated surface, and its internal structure consists, as shown by transverse sections, of a number of large, segregated lobes, parallel to each other and each furnished with a central duct, that communicates with the sac, containing the bristle ¹).

It is a well-known fact, that also in other species of earthworms (f. i. *Lumbricus*, *Acanthodrilus*), which possess modified setae, these are not confined to the segments, bearing the male generative pores; however in those species the genital setae of different regions of the body have all the same appearance. Beddard ²) observed that in some specimens of *Ac. Layardi* — a species suggested by me to be identical with *Ac. ungulatus* Perr. — the ventral pairs of setae on segment 8, the same segment that contains the anterior spermathecae, were replaced by stout, long bristles, very similar to the penial setae. They were contained in a thin-walled sac, precisely as are the genital setae. On either side of this sac he recognized a long, somewhat sausage-shaped glandular body, which communicates by a slender duct with the orifice, through which the setae project on to the exterior. Beddard believes these glands to be the equivalents of the glands, which he found in *Ac. multiporus* corresponding to the setae. However the large glands, observed in our species, do not appear to me to be referable to the same category, but they may be rather special structures, hitherto not observed in any species of earthworms, as far I am aware of.

There are two pairs of copulatory pouches, situated in segment 8 and 9 (fig. 1 and 2, *sp*); they consist of large, globular bodies, communicating with the exterior by a short, stout-walled duct. At the under extremity of the duct, not far from its external aperture, it possesses at the anterior and the posterior side a small diverticulum; these diverticula, only obvious in transverse sections, have their cavity divided in two or three compartments, which are densely filled up with spermatozoa. It is a curious

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1) A more detailed account of the minute structure of the genital region I hope to publish elsewhere.

2) Proceed. Zool. Society of London, 1886, p. 168.

fact, already stated by Beddard[1]), that usually we find the spermatozoa contained within the supplementary pouches and not in the main copulatory pouch. I observed it in some specimens of *Perichaeta* and Beddard made the same statement with regard to the spermathecae of three species of *Acanthodrilus* from New Zealand.

The stout wall of the duct of each spermatheca not only consists of muscular tissue but also contains numerous tubular glands; these glandular tubes lie parallel to the longitudinal axis of the duct and enter its lumen quite near the external aperture.

With regard to the other particulars of its structure this species appears to agree very closely with *Ac. Büttikoferi.*

The intestinal canal is furnished with two gizzards (*g*) and with three pairs of lobed coeca (*gl*) in the segments 15 and 16; at the anterior side of the fifth septum two racemous glands are situated, surrounding the oesophagus on each side (*n*), and the segmental organs are replaced by tufts of faint tubes, especially obvious in the segments of the girdle. The funnels of the vasa deferentia (*f*) are situated in the 11th and 12th segments, enclosed in an unpaired vesicula seminalis, which surrounds the ventral nerve-cord and extends forward till into the 10th segment; in the 12th and 13th ring other paired vesiculae seminales are situated, which are connected with the unpaired sac.

The ovaries (*o*) are to be found in the 14th segment; they do not consist of a single contiguous mass of eggs, like in *Ac. Büttikoferi*, but are represented by a group of irregularly shaped grapes, containing numerous ripe ova.

The prostate glands (*pr*) consist of very long, highly coiled, tubular bodies.

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1) Proceed. Zool. Society of London, 1885, p. 830.

EXPLANATION

OF

Plate 6.

Fig. 1. *Ac. Beddardi* Horst; general view of the internal organs of the worm, opened from the dorsal side: *f.* vas-deferens funnel; *g.* gizzard; *gl.* intestinal coeca; *lv.* lateral vessel; *m.* the large muscles of the copulatory bristles; *n.* modified nephridia; *o.* ovary; *pr.* prostate glands; *sp.* spermatheca; *vs.* vesicula seminalis; *x.* gland. × $2^1/_2$ diam.

Fig. 2. Region of the copulatory pouches of the right side, higher magnified; the anterior spermatheca is turned to the left: *cb.* copulatory bristles (reserve-bundle); other letters as before.

Fig. 3. Distal end of a penial seta: *a.* dorsal aspect; *b.* ventral aspect; higly magnified.

Fig. 4. Distal end of a copulatory seta, from the vicinity of the spermathecae; highly magnified.

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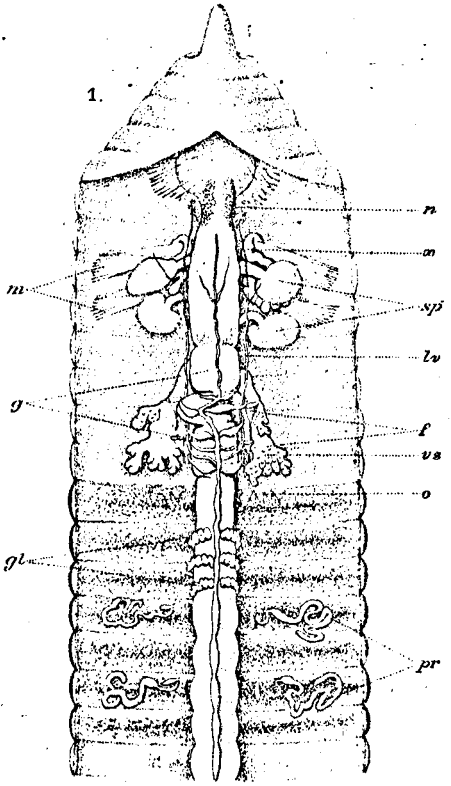
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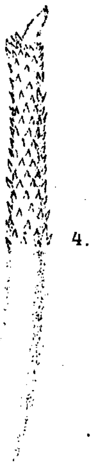

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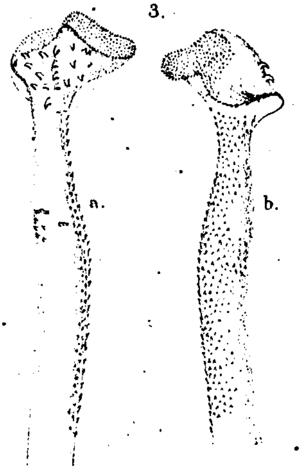

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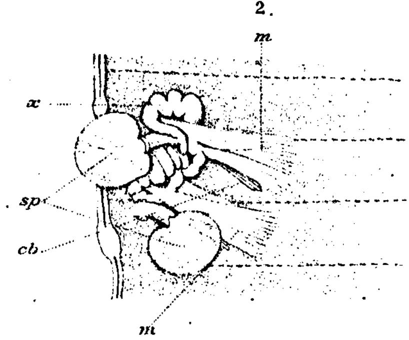

Dr. R. Horst ad nat. del. A. J. J. Wendel lith. P. W. M. Trap impr.

Acanthodrilus Beddardi *Horst.*